FIG. 1

CLASSIFICATIONS OF TYPES OF MUSCLE FIBERS

SLOW-TWITCH FIBER	FAST-TWITCH FIBER	
RED MUSCLE FIBER	WHITE MUSCLE FIBER	
TYPE I FIBER	TYPE II FIBER	
TYPE I FIBER	TYPE II A FIBER	TYPE II B FIBER
SO FIBER	FOG FIBER (INTERMEDIATE MUSCLE FIBER)	FG FIBER

FIG. 2

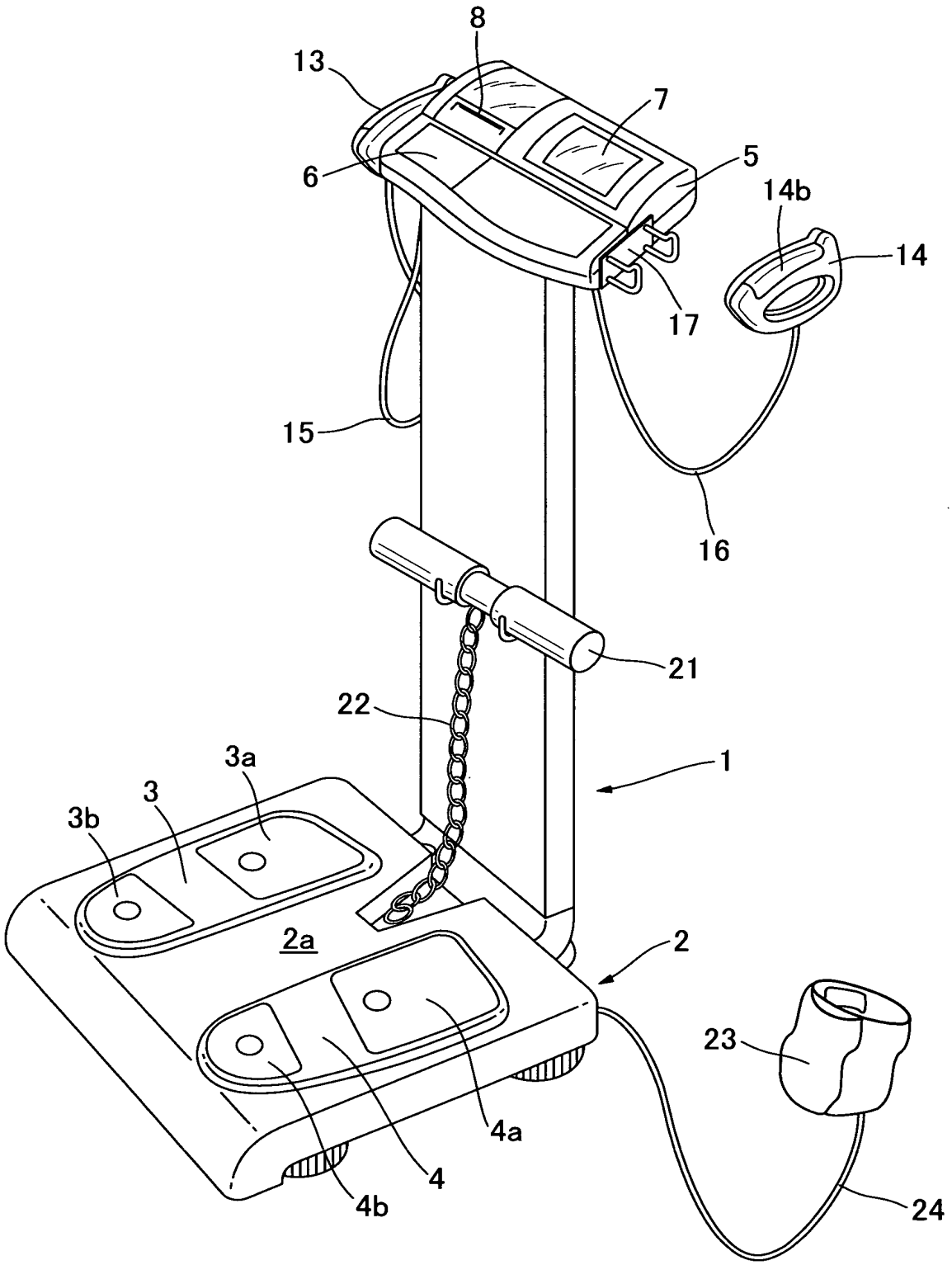


FIG. 3

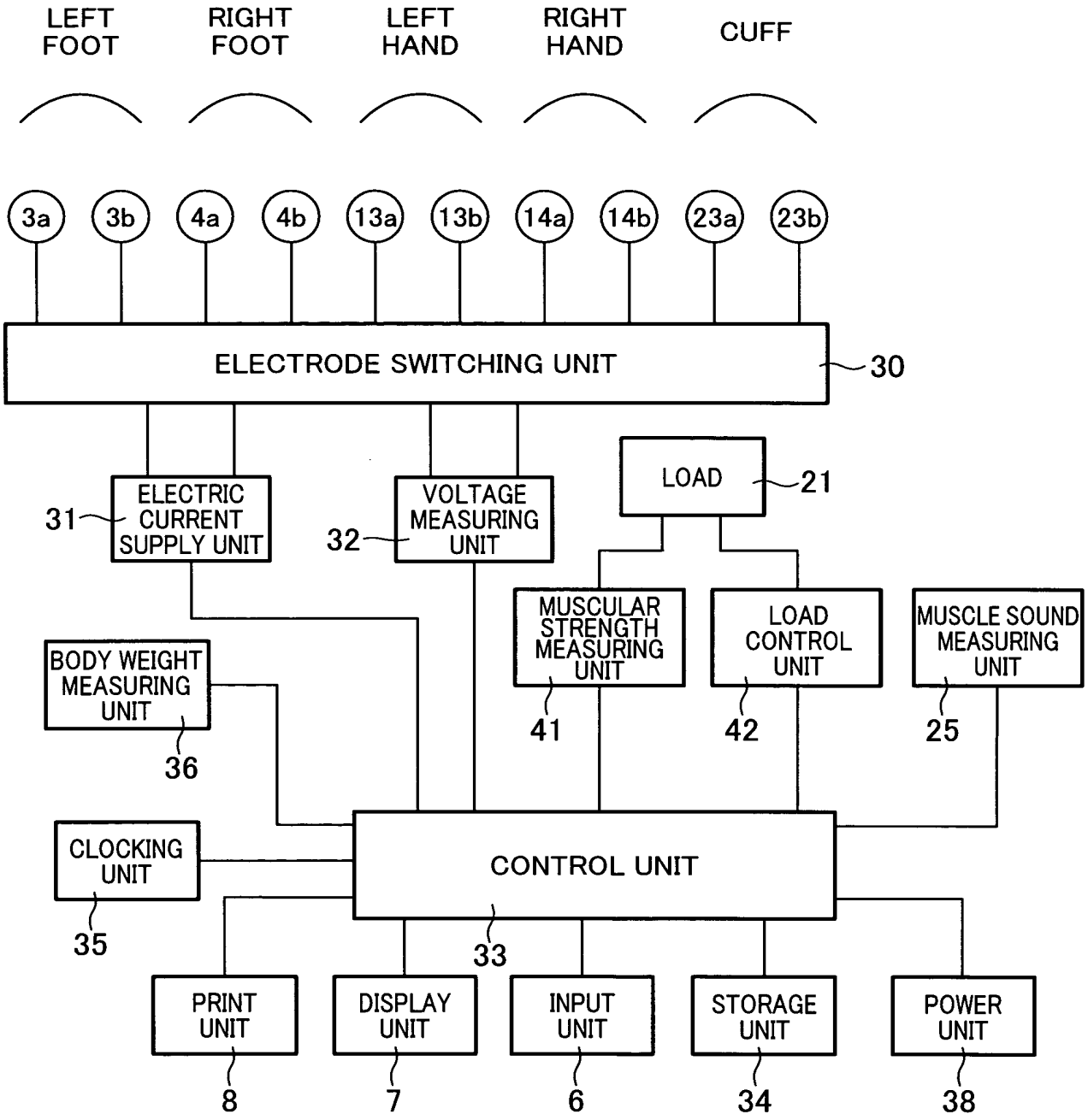

LEFT FOOT
RIGHT FOOT
LEFT HAND
RIGHT HAND
CUFF
3a
3b
4a
4b
13a
13b
14a
14b
23a
23b
ELECTRODE SWITCHING UNIT
30
ELECTRIC CURRENT SUPPLY UNIT
31
VOLTAGE MEASURING UNIT
32
LOAD
21
MUSCULAR STRENGTH MEASURING UNIT
41
LOAD CONTROL UNIT
42
MUSCLE SOUND MEASURING UNIT
25
BODY WEIGHT MEASURING UNIT
36
CLOCKING UNIT
35
CONTROL UNIT
33
PRINT UNIT
8
DISPLAY UNIT
7
INPUT UNIT
6
STORAGE UNIT
34
POWER UNIT
38

FIG. 4

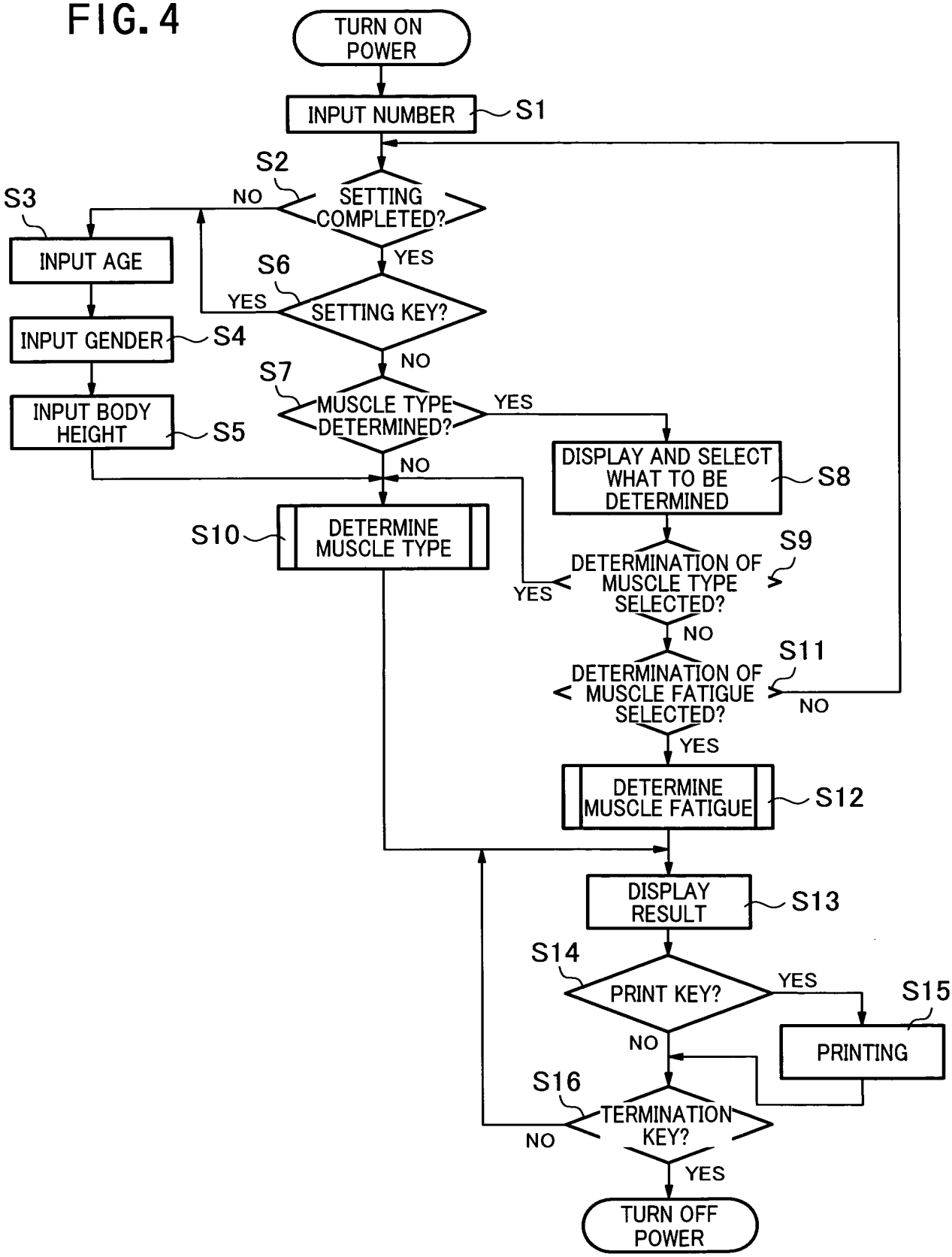

TURN ON POWER
INPUT NUMBER
S1
S2
SETTING COMPLETED?
NO
YES
S3
INPUT AGE
S6
SETTING KEY?
YES
INPUT GENDER
S4
NO
S7
MUSCLE TYPE DETERMINED?
YES
INPUT BODY HEIGHT
S5
NO
DISPLAY AND SELECT WHAT TO BE DETERMINED
S8
S10
DETERMINE MUSCLE TYPE
S9
DETERMINATION OF MUSCLE TYPE SELECTED?
YES
NO
S11
DETERMINATION OF MUSCLE FATIGUE SELECTED?
NO
YES
DETERMINE MUSCLE FATIGUE
S12
DISPLAY RESULT
S13
S14
PRINT KEY?
YES
S15
PRINTING
NO
S16
TERMINATION KEY?
NO
YES
TURN OFF POWER

FIG. 5

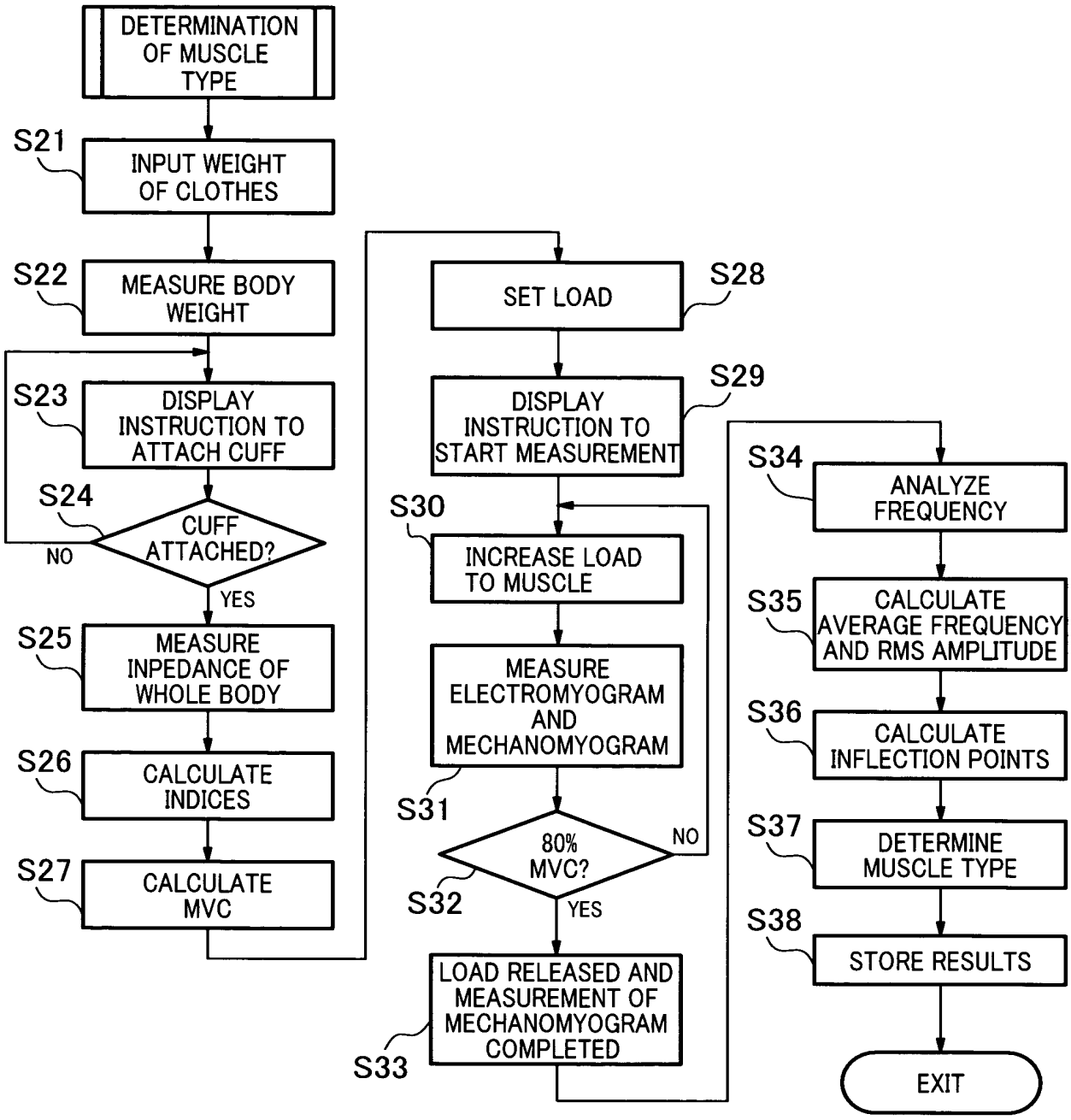

DETERMINATION OF MUSCLE TYPE
S21
INPUT WEIGHT OF CLOTHES
S22
MEASURE BODY WEIGHT
S23
DISPLAY INSTRUCTION TO ATTACH CUFF
S24
CUFF ATTACHED?
NO
YES
S25
MEASURE INPEDANCE OF WHOLE BODY
S26
CALCULATE INDICES
S27
CALCULATE MVC
S28
SET LOAD
S29
DISPLAY INSTRUCTION TO START MEASUREMENT
S30
INCREASE LOAD TO MUSCLE
MEASURE ELECTROMYOGRAM AND MECHANOMYOGRAM
S31
80% MVC?
NO
S32
YES
LOAD RELEASED AND MEASUREMENT OF MECHANOMYOGRAM COMPLETED
S33
S34
ANALYZE FREQUENCY
S35
CALCULATE AVERAGE FREQUENCY AND RMS AMPLITUDE
S36
CALCULATE INFLECTION POINTS
S37
DETERMINE MUSCLE TYPE
S38
STORE RESULTS
EXIT

FIG. 6

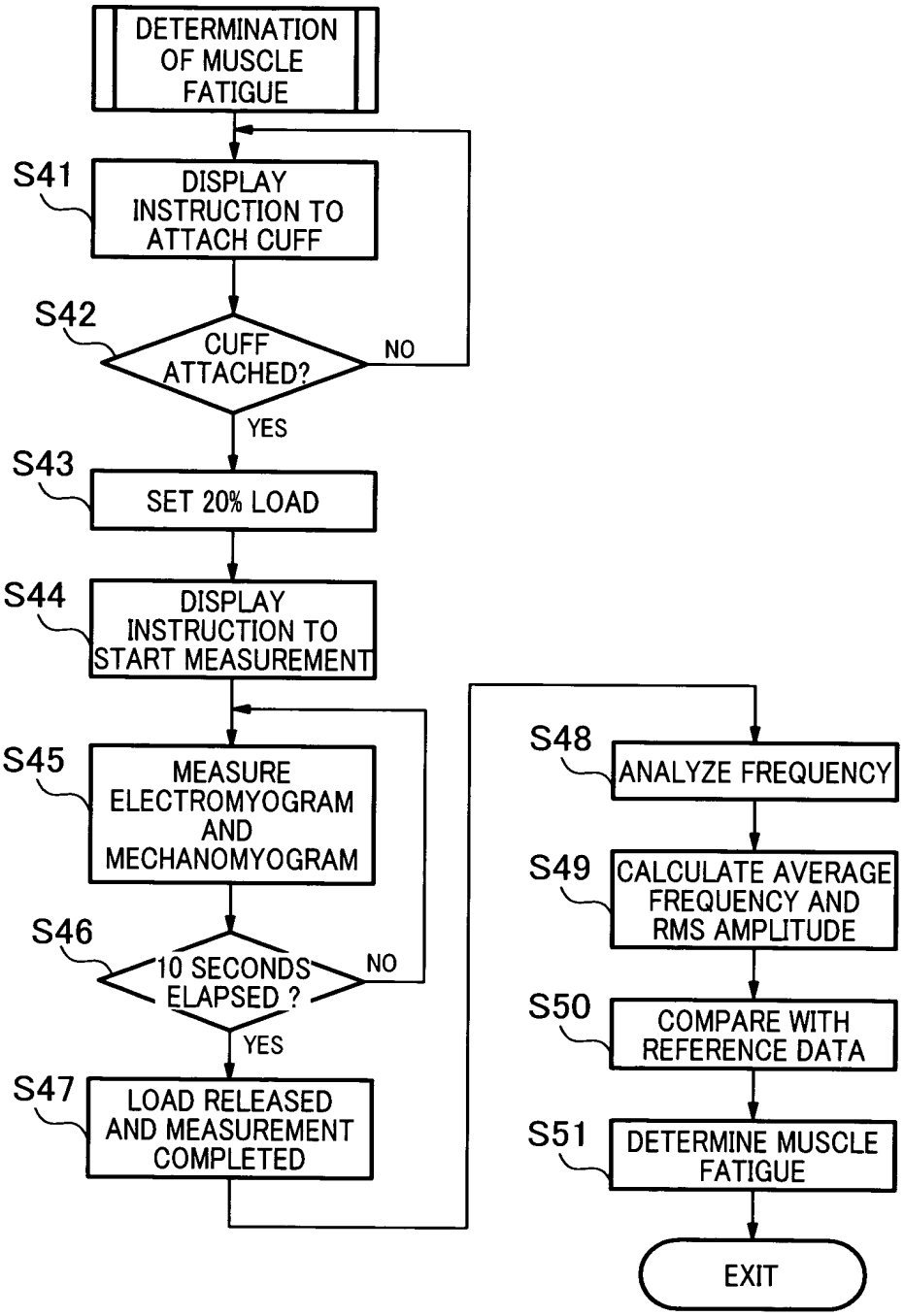

DETERMINATION OF MUSCLE FATIGUE
S41
DISPLAY INSTRUCTION TO ATTACH CUFF
S42
CUFF ATTACHED?
NO
YES
S43
SET 20% LOAD
S44
DISPLAY INSTRUCTION TO START MEASUREMENT
S45
MEASURE ELECTROMYOGRAM AND MECHANOMYOGRAM
S46
10 SECONDS ELAPSED ?
NO
YES
S47
LOAD RELEASED AND MEASUREMENT COMPLETED
S48
ANALYZE FREQUENCY
S49
CALCULATE AVERAGE FREQUENCY AND RMS AMPLITUDE
S50
COMPARE WITH REFERENCE DATA
S51
DETERMINE MUSCLE FATIGUE
EXIT

FIG. 7

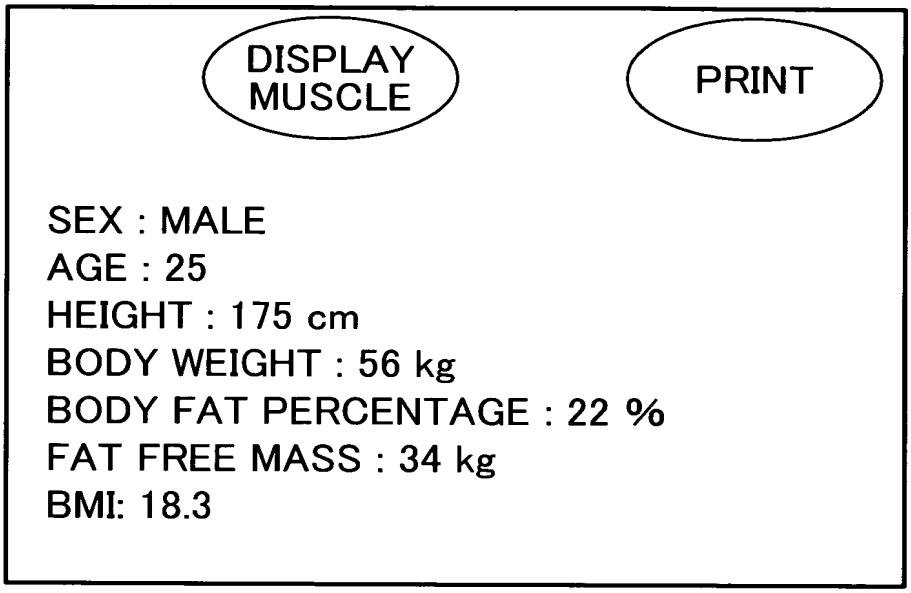

DISPLAY MUSCLE
PRINT
SEX : MALE
AGE : 25
HEIGHT : 175 cm
BODY WEIGHT : 56 kg
BODY FAT PERCENTAGE : 22 %
FAT FREE MASS : 34 kg
BMI: 18.3

FIG. 8

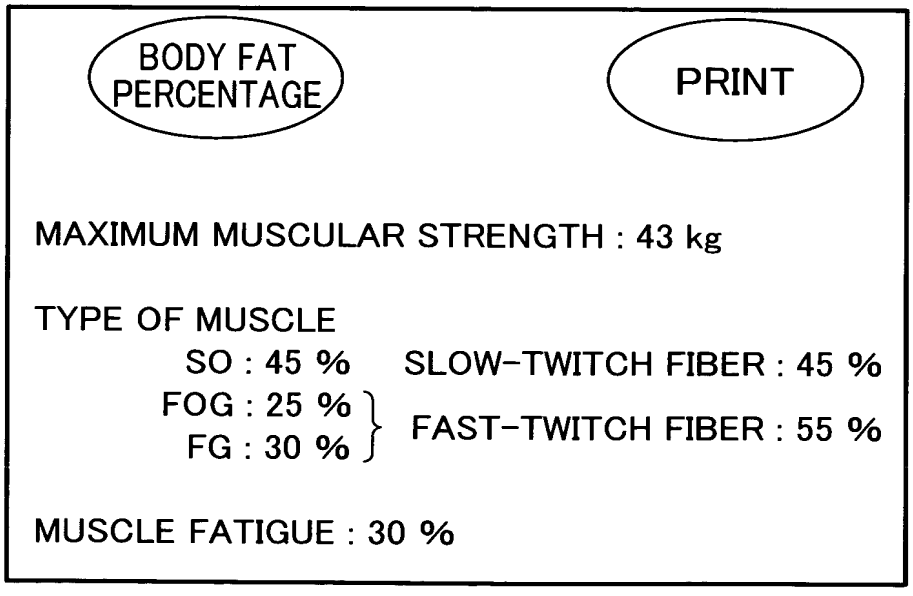

BODY FAT PERCENTAGE
PRINT
MAXIMUM MUSCULAR STRENGTH : 43 kg
TYPE OF MUSCLE
SO : 45 %
SLOW-TWITCH FIBER : 45 %
FOG : 25 %
FG : 30 %
FAST-TWITCH FIBER : 55 %
MUSCLE FATIGUE : 30 %

FIG. 9

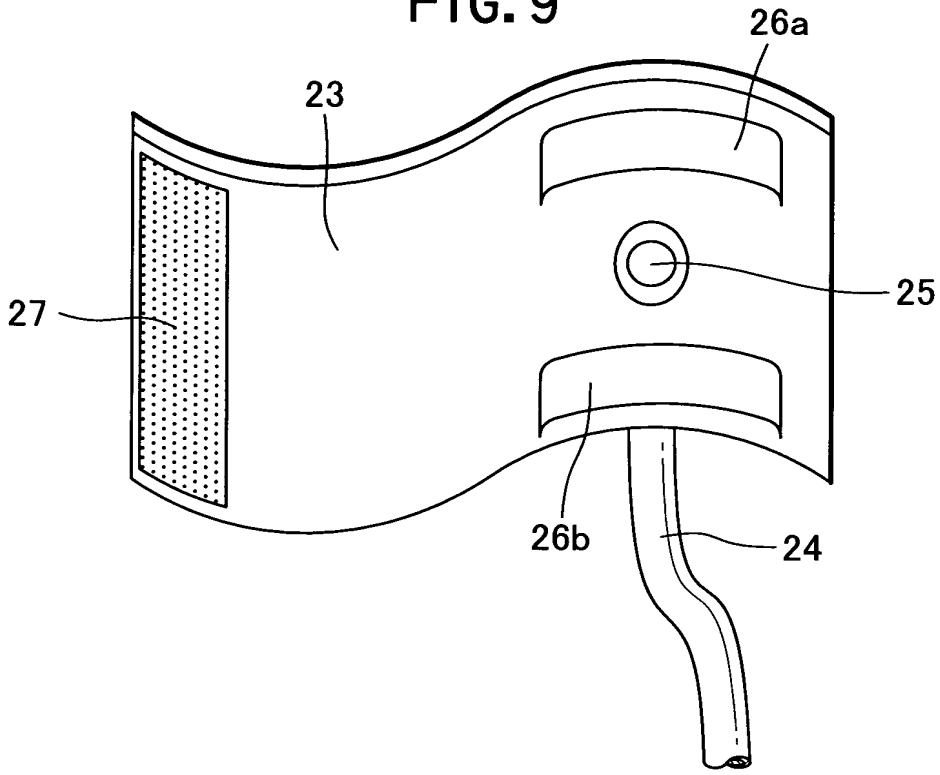

26a
23
27
25
26b
24

FIG. 10

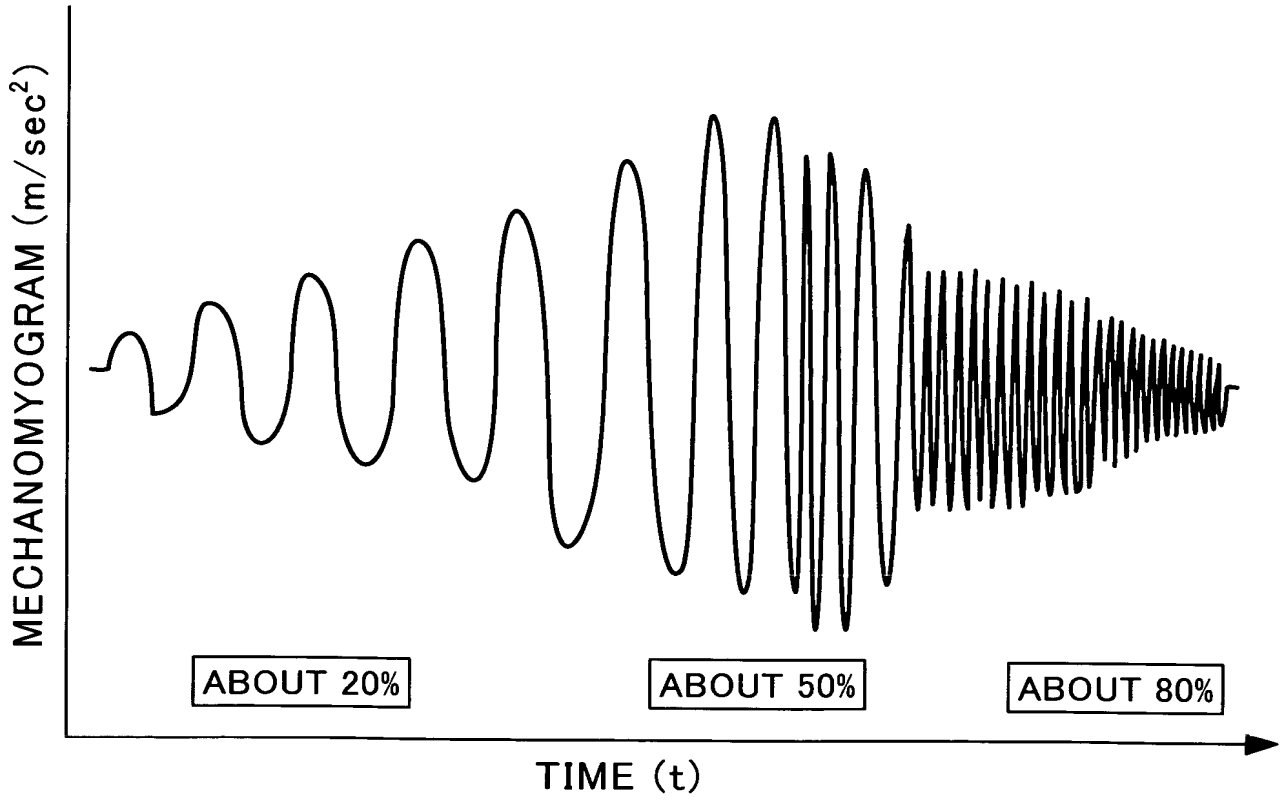

MECHANOMYOGRAM (m/sec²)
ABOUT 20%
ABOUT 50%
ABOUT 80%
TIME (t)

FIG. 11

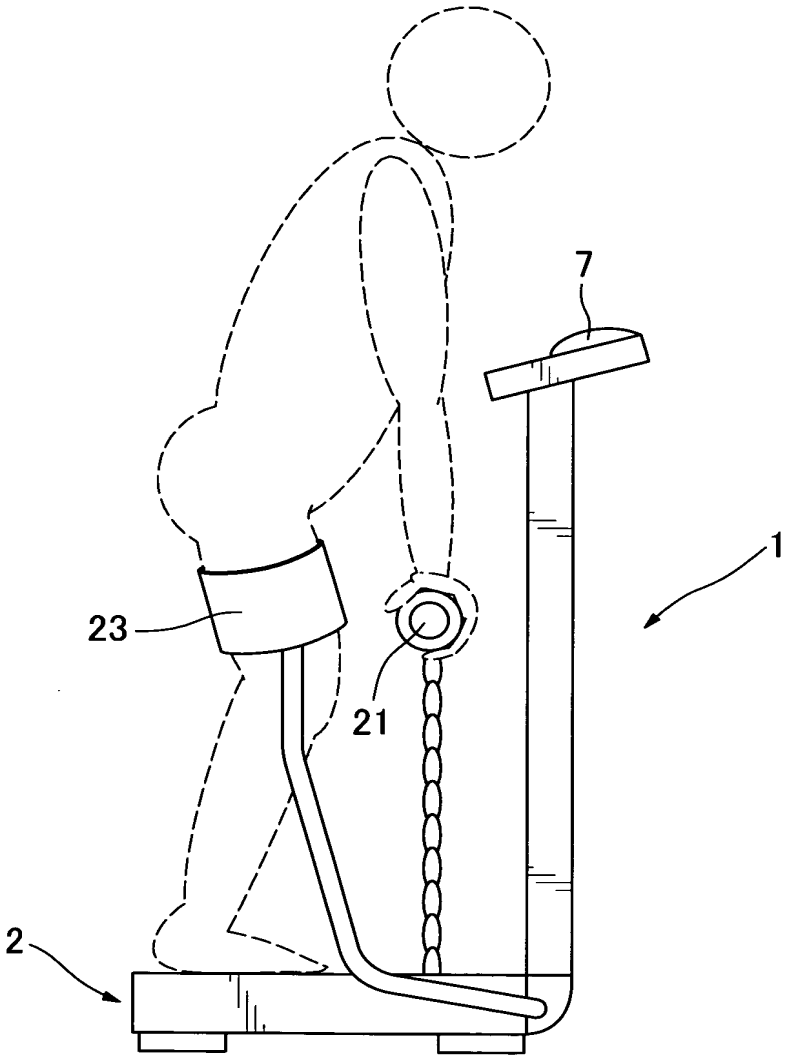


FIG. 12

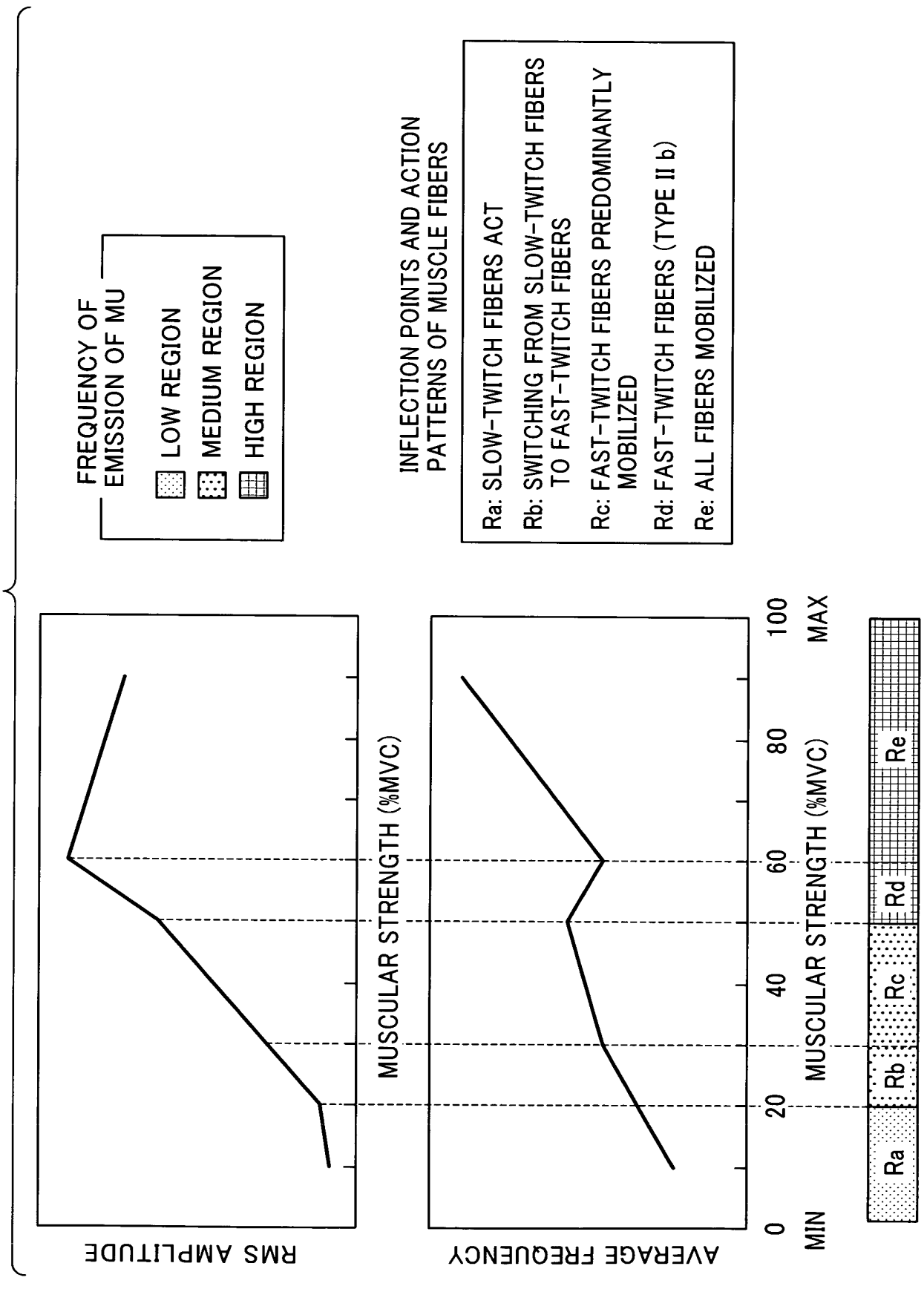

FREQUENCY OF EMISSION OF MU
LOW REGION
MEDIUM REGION
HIGH REGION
INFLECTION POINTS AND ACTION PATTERNS OF MUSCLE FIBERS
Ra: SLOW-TWITCH FIBERS ACT
Rb: SWITCHING FROM SLOW-TWITCH FIBERS TO FAST-TWITCH FIBERS
Rc: FAST-TWITCH FIBERS PREDOMINANTLY MOBILIZED
Rd: FAST-TWITCH FIBERS (TYPE II b)
Re: ALL FIBERS MOBILIZED
RMS AMPLITUDE
MUSCULAR STRENGTH (%MVC)
AVERAGE FREQUENCY
MUSCULAR STRENGTH (%MVC)
MIN
0
20
40
60
80
100
MAX
Ra
Rb
Rc
Rd
Re

FIG. 13

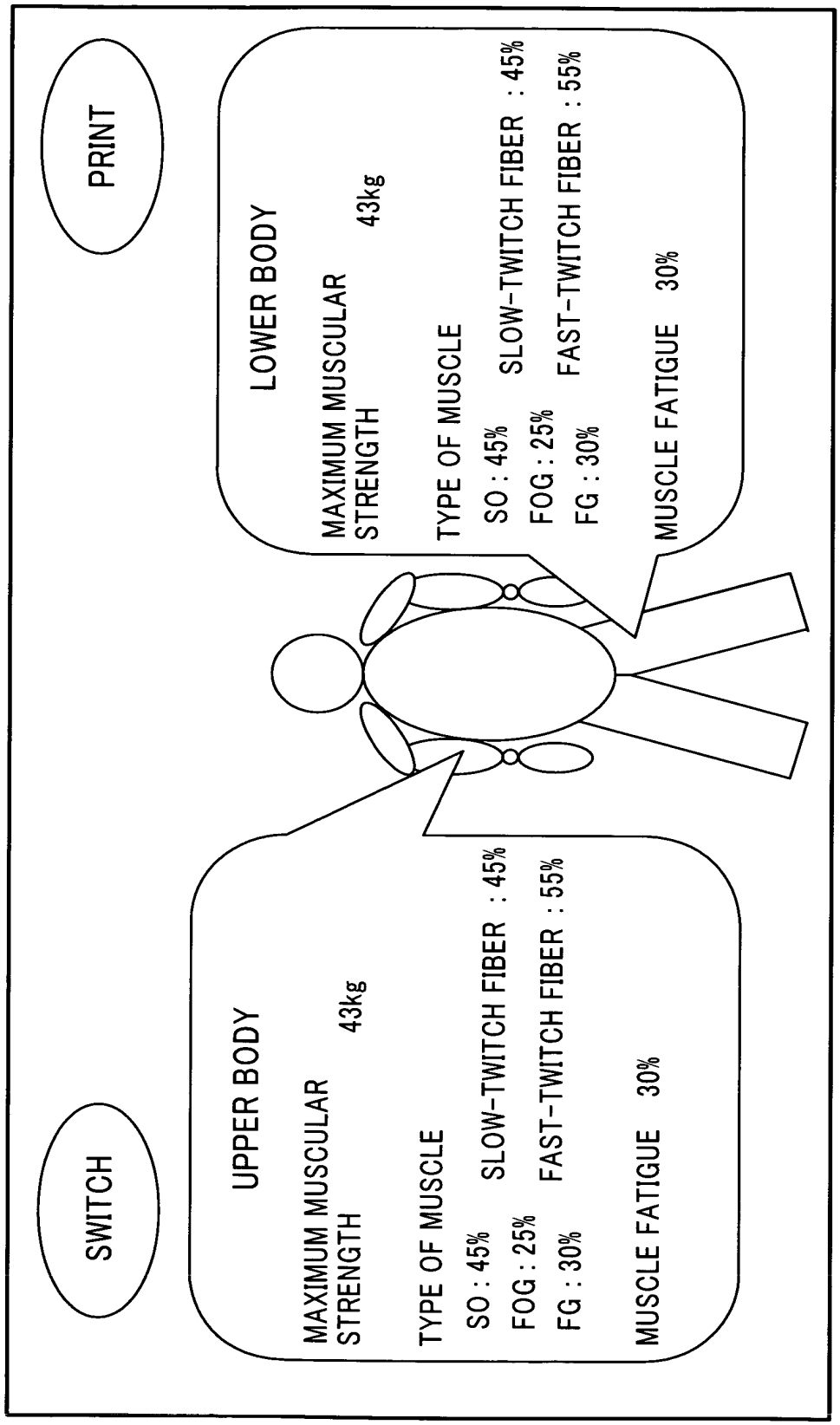
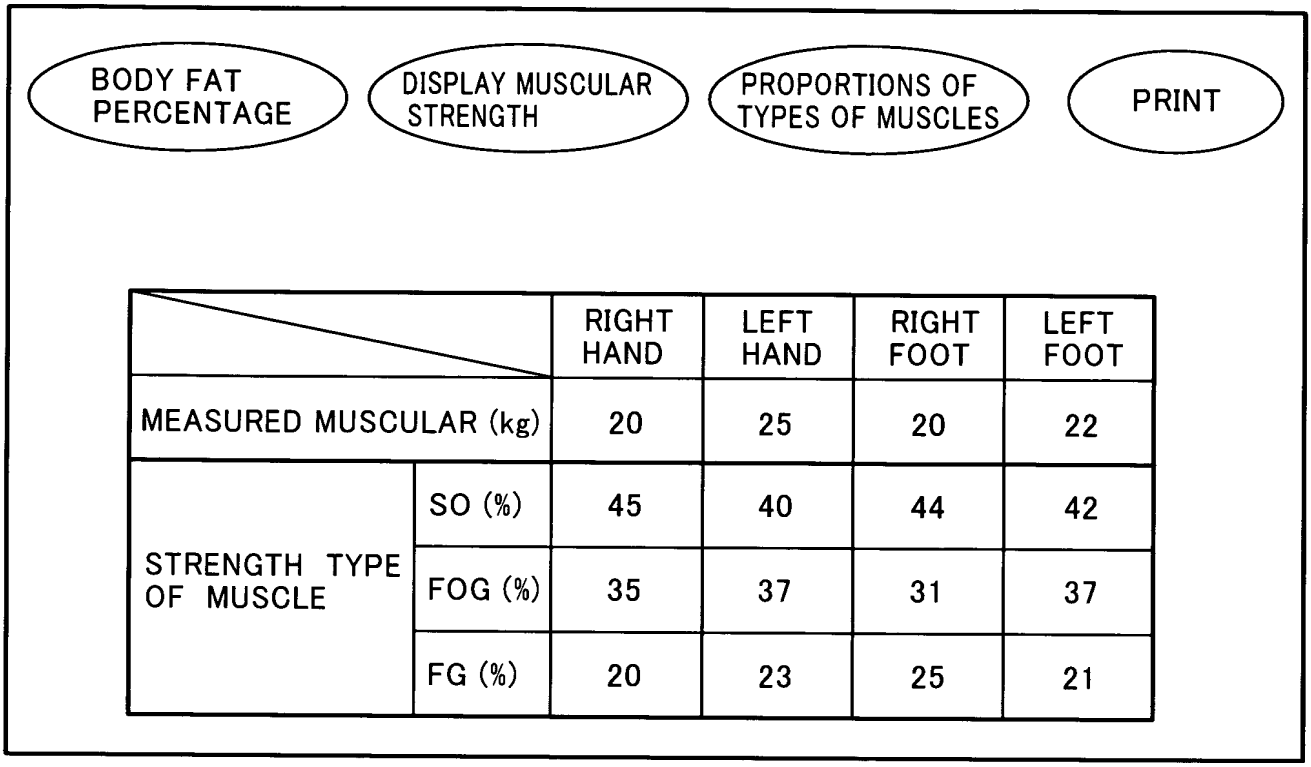

SWITCH
PRINT
UPPER BODY
MAXIMUM MUSCULAR STRENGTH 43kg
TYPE OF MUSCLE
SO : 45% SLOW-TWITCH FIBER : 45%
FOG : 25% FAST-TWITCH FIBER : 55%
FG : 30%
MUSCLE FATIGUE 30%
LOWER BODY
MAXIMUM MUSCULAR STRENGTH 43kg
TYPE OF MUSCLE
SO : 45% SLOW-TWITCH FIBER : 45%
FOG : 25% FAST-TWITCH FIBER : 55%
FG : 30%
MUSCLE FATIGUE 30%

FIG. 14



		RIGHT HAND	LEFT HAND	RIGHT FOOT	LEFT FOOT
MEASURED MUSCULAR (kg)		20	25	20	22
STRENGTH TYPE OF MUSCLE	SO (%)	45	40	44	42
	FOG (%)	35	37	31	37
	FG (%)	20	23	25	21

FIG. 15

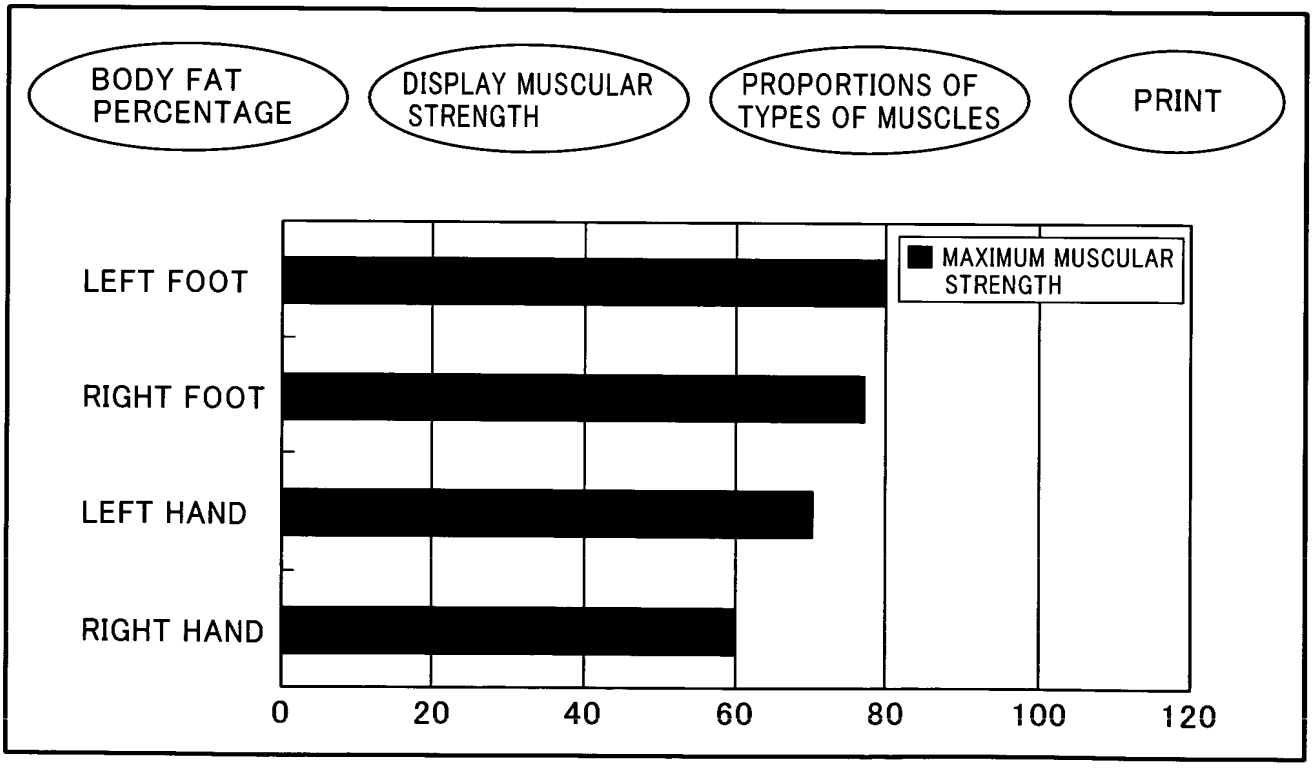
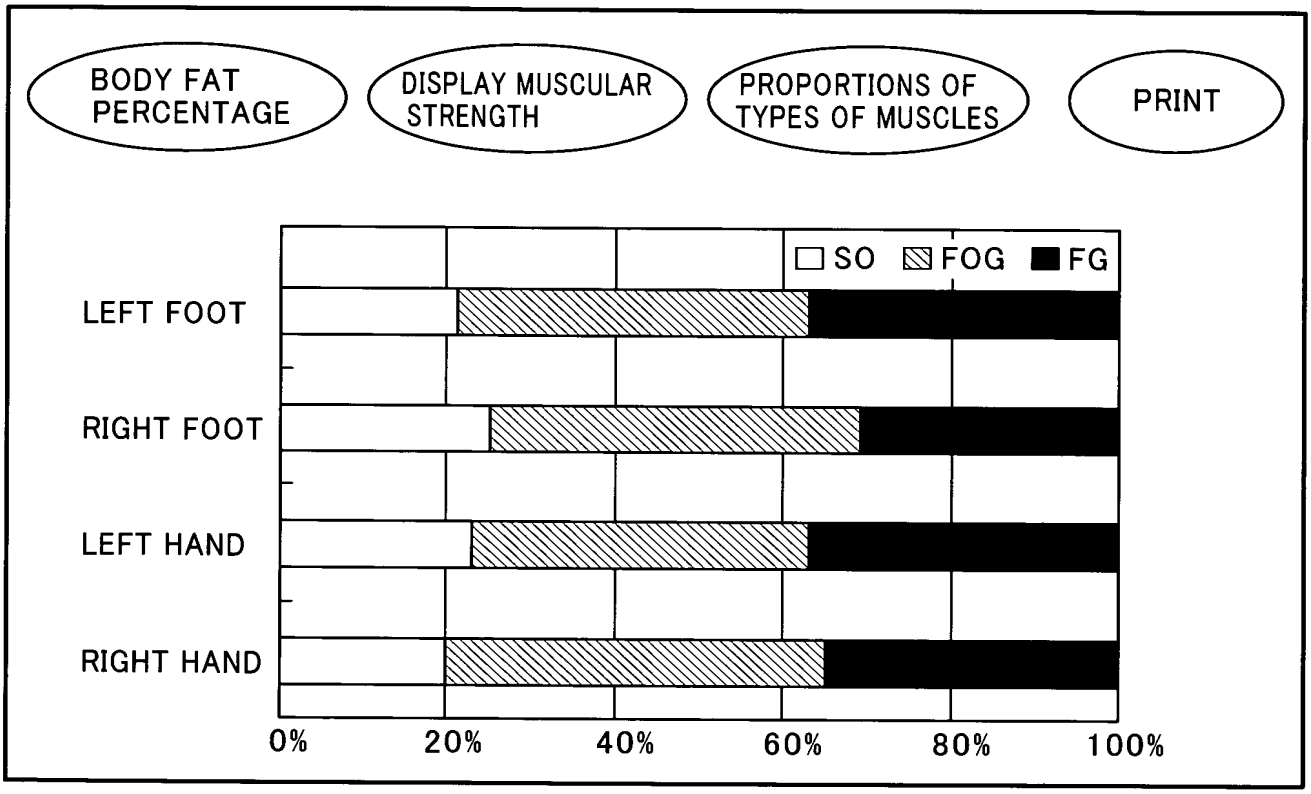


FIG. 16


BODY FAT PERCENTAGE
DISPLAY MUSCULAR STRENGTH
PROPORTIONS OF TYPES OF MUSCLES
PRINT
SO
FOG
FG
LEFT FOOT
RIGHT FOOT
LEFT HAND
RIGHT HAND
0%
20%
40%
60%
80%
100%